



# UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,197	11/25/2003	Hideaki Okamura	60188-717	4226

7590 01/11/2006

Jack Q. Lever, Jr.  
McDERMOTT, WILL & EMERY  
600 Thirteenth Street, N.W.  
Washington, DC 20005-3096

EXAMINER

NGUYEN, DILINH P

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/720,197	<b>Applicant(s)</b> OKAMURA ET AL.	
	<b>Examiner</b> DiLinh Nguyen	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiyutsuto (J.P. 7-2888247) in view of Ohkuni et al. (U.S. Pat. 6187688).

Ochiyutsuto discloses a method for fabricating a semiconductor device, comprising the step of:

forming a thin film made of an inorganic material (silicon oxide);

forming a resist film 3 on the thin film and thereafter patterning the formed resist film to form a resist pattern from the resist film; and

performing dry etching of the thin film 2 using as a mask the resist pattern (cover figs. and abstract).

Ochiyutsuto does not disclose the step of exposing the carbon resist pattern to a gas containing sulfur.

However, Ohkuni et al. disclose a method for fabricating a semiconductor device, comprising the steps of: forming a resist film 45 containing carbon and thereafter patterning the formed resist film to form a resist pattern from the resist film; and exposing the resist pattern to a gas containing sulfur (cover fig., column 6, lines 58-64). Therefore, it would have been obvious to one having ordinary in the art at the time the

invention was made to modify the process step of Ochiyutsuto by exposing the carbon resist pattern to a gas containing sulfur because as taught by Ohkuni et al., the gas containing sulfur would protect the pattern sidewalls (column 6, lines 63-64).

- Regarding claim 2, Ochiyutsuto discloses that the inorganic material contains silicon and an etching gas employed for the dry etching is a fluorocarbon gas (abstract).
- Regarding claim 5, Ohkuni et al. disclose the step of exposing the resist pattern to the gas containing sulfur and the step of performing dry etching constitute the same step (column 7, lines 25-33).

3. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiyutsuto (J.P. 7-2888247) in view of Ohkuni et al. (U.S. Pat. 6187688) and further in view of Ni et al. (U.S. Pat. 6746961).

Ochiyutsuto and Ohkuni et al. do not disclose the gas containing sulfur is sulfur dioxide and in a plasma state.

However, Ni et al. disclose a method for fabricating a semiconductor device, comprising the step of: the gas containing sulfur is sulfur dioxide and the gas is in a plasma state (column 8, lines 35-42). Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the process step of Ohkuni et al. by forming the sulfur dioxide etchant gas and the gas is in a plasma state because as taught by Ni et al., the sulfur dioxide gas in plasma state would control the etched process for the semiconductor device (column 8, lines 41-42).

4. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiyutsuto (J.P. 7-2888247) in view of Ohkuni et al. (U.S. Pat. 6187688) and further in view of Namatsu et al. (U.S. Pat. 6576066).

Ochiyutsuto and Ohkuni et al. do not explicitly disclose a line width of the resist pattern is 200 nm or less and a value of the ratio of a height of the resist pattern to a line width thereof is 2.8 or more.

However, Namatsu et al. disclose a method for fabricating a semiconductor device, comprising the step of: forming a line width of the resist pattern 401a is 30 nm and a value of the ratio of a height of the resist pattern to a line width thereof is 5 (column 8, lines 38-40). Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the process step of the above combination by forming the line width of the resist pattern is 30 nm and a value of the ratio of a height of the resist pattern to a line width thereof is 5 because as taught by Namatsu et al., the width is 30 nm and the ratio of the height to the width is 5 would provide the device structure in a particular application.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN



HOAI PHAM  
PRIMARY EXAMINER